

1,2-PROPYLENEIMINE

1,2-Propyleneimine is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 75-55-8

Molecular Formula: C₃H₇N



1,2-Propyleneimine is a colorless, oily liquid with an odor similar to aliphatic amines (HSDB, 1991). It is soluble in water, ethanol, and most organic solvents (Sax, 1987). It is a dangerous fire hazard when exposed to heat or flame (Sax, 1989).

Physical Properties of 1,2-Propyleneimine

Synonyms: 2-methyl aziridine; 2-methylazacycloprane; 2-methylethylenimine; methylethylenimine

Molecular Weight:	57.11
Boiling Point:	66 - 67 °C
Melting Point:	-65 °C
Flash Point:	14 °F
Vapor Density:	2.0 (air = 1)
Density/Specific Gravity:	1.4109 at 25/4 °C (water = 1)
Vapor Pressure:	112 mm Hg at 20 °C
Conversion Factor:	1 ppm = 2.34 mg/m ³

(HSDB, 1991; Sax, 1987; Sax, 1989; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

1,2-Propyleneimine is used for surface coating resins to improve adhesion (HSDB, 1991).

The primary sources of 1,2-propyleneimine emissions in California reported in the United States Environmental Protection Agency's (U.S. EPA) 1995 Toxics Release Inventory (TRI) Public Data Release Report were the chemical and allied products industries (U.S. EPA, 1996b).

B. Emissions

In California, approximately 77 pounds of 1,2-propyleneimine emissions were reported in the U.S. EPA 1995 TRI Public Data Release Report (U.S. EPA, 1996b).

C. Natural Occurrence

1,2-Propyleneimine is not known to occur naturally (HSDB, 1991).

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of 1,2-propyleneimine.

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of 1,2-propyleneimine was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

1,2-Propyleneimine is expected to be present in the atmosphere in the gas phase, and to react with the hydroxyl radical. A rate constant has been reported for the gas-phase reaction of the hydroxyl radical with ethyleneimine (Atkinson, 1989), and 1,2-propyleneimine is expected to be at least as reactive as ethyleneimine. Using the rate constant measured for ethyleneimine, a half-life of 1.7 days was calculated for 1,2-propyleneimine (Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

1,2-Propyleneimine emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to 1,2-propyleneimine are inhalation and dermal contact.

Non-Cancer: Acute inhalation exposure to 1,2-propyleneimine causes severe irritation to the eyes and respiratory tract in humans. Symptoms include headache, dizziness, nausea, bronchitis, shortness of breath, and pulmonary edema. Direct contact is very irritating to the skin. No information is available on the chronic effects of 1,2-propyleneimine in humans. Kidney, blood,

and gastrointestinal effects have been reported in animals exposed by inhalation and oral routes (U.S. EPA, 1994a).

The U.S. EPA has determined that there are inadequate data to establish a Reference Concentration (RfC) for 1,2-propyleneimine, and has not established an oral Reference Dose (RfD) (U.S. EPA, 1994a).

No information available on adverse reproductive or developmental effects of 1,2-propyleneimine in humans or animals (U.S. EPA, 1994a).

Cancer: No information is available on the carcinogenic effects of 1,2-propyleneimine in humans. Tumors of the mammary glands and intestine, leukemias, and other tumor types have been reported in orally exposed animals. The U.S. EPA has classified 1,2-propyleneimine as Group B2: Probable human carcinogen (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified 1,2-propyleneimine as Group 2B: Possible human carcinogen, based on sufficient evidence in animals (IARC, 1987a).

